Fibromyalgia: Heterogeneity in personality and psychopathology and its implications

Abstract

The fibromyalgia syndrome (FM) is a chronic widespread pain condition whose etiology remains unknown and no treatment has satisfactory levels of success. A meta-analysis has identified a distinct Minnesota Multiphasic Personality Inventory-2 (MMPI-2) clinical profile between FM female patients and healthy controls, and differences between FM and other chronic pain condition with clear etiology have also been found. However, heterogeneity in this population has been suggested in several studies. We aim to assess clinical aspects in FM patients, based on personality psychopathology characteristics, in order to explore heterogeneity and the existence of core common aspects. In this cross-sectional study, a relatively homogeneous sample of 56 female FM patients (M_{age} = 45.95, SD_{age} = 9.39) was assessed through MMPI-2. A K-Means cluster analysis identified two clusters, one (n = 24) with clinically significant levels in *Negative Emotionality* and *Introversion* scales. Subsequent MANOVAs identified important features of this cluster on several MMPI-2 dimensions. Moreover, several dimensions are clinically elevated in both clusters. In conclusion, the combination of psychopathological negative emotionality, interpersonal isolation, and low hedonic capacity, in a group of patients, has implications for the daily living and treatment of FM patients, and several core aspects of FM need to be addressed.

Keywords: Fibromyalgia; personality characteristics; psychopathology dimensions; MMPI-2

Fibromyalgia (FM) is a syndrome characterized by chronic widespread pain, which is frequently associated with fatigue, sleep disorder, other functional somatic syndromes, mental and physical disorders, as well as disability and diminished quality

of life. Although a central sensitization phenomena has been associated to FM (Ablin et al., 2012; Arnold et al., 2016) the etiopathology of FM remains unknown (Thieme, Mathys, & Turk, 2017). Some authors conceptualize this syndrome as part of a group of affective spectrum disorders (e.g., Arnold et al., 2004), as it has a high comorbidity with psychiatric disorders. In addition, a high prevalence of alexithymia has been found in FM patients (Di Tella et al., 2018). The fact that FM is a medically unexplained syndrome, and the quality of evidence of a large range of treatments for FM are only modest and has not shown significant improvement over the past two decades (Thieme et al., 2017) presents a challenge to clinical psychology and its contribution to the understanding and treatment of FM.

In the scope of an integrative biopsychosocial approach to FM, psychological aspects may play an important role as predisposing factors to FM, and personality is one of those aspects (Eich, Hartmann, Muller, & Fischer, 2000; Malin & Littlejohn, 2012; Van Houdenhove, Luyten, & Egle, 2009). Within a diathesis-stress model of disease, some personality and psychopathology features that make people more vulnerable to stressors would be antecedent to FM, interacting with physiological vulnerabilities to the development of the syndrome (Thiagarajah Guymer, Leech, & Littlejohn, 2014).

A recent meta-analysis focused on the Minnesota Multiphasic Personality Inventory (MMPI-2) has shown that female FM patients have a psychopathology profile significantly different than the profile of healthy volunteers (Novo, Gonzalez, Peres, & Aguiar, 2017a; 2017b). Nevertheless, it also acknowledged that the FM patients are probably a heterogeneous group regarding personality and psychopathology profiles.

Pertaining to psychopathology, with the original MMPI, Ahles, Yunus, Riley, Bradley, & Masi (1984) found a large group of FM patients with a clinical profile within the normal range, followed by a group with the typical chronic pain profile

(clinically significant scores on the "neurotic triad scales", i.e., hypochondriasis, depression and hysteria), and a smaller group with the psychopathological profile (significant elevations in several clinical scales) was found. On the contrary, some studies found a larger cluster with the psychopathological profile (Claros et al., 2006; Porter-Moffitt et al., 2006).

Pertaining to personality only, within the five factor model of personality, a cluster with higher Neuroticism and lower Conscienciousness is identified (Bucourt et al., 2018; Torres et al., 2013) and also with lower Extraversion (Torres et al., 2013) associated with more self-reported pain (Bucourt et al., 2018).

Finally, the distressed type or Type D personality, a specific combination of Negative Affectivity and Social Inhibition, has been more recently studied in this population, and it constitutes our main interest. Van Middentorp et al. (2016) found a high prevalence within an FM sample, and Ablin, Zohar, Zaraya-Blum, and Buskila (2016) found a higher prevalence of Type D personality in one of the FM clusters, associated with a less adaptive pattern.

In conclusion, we intend to explore heterogeneity based on structural personality psychopathology dimensions (as most of the studies focus on clinical psychopathology dimensions), within a community sample with a homogeneous age range. We hypothesize that different clinical levels in the psychopathology and personality dimensions will be found.

Method

Participants

The participants were 56 FM female patients between 30 and 60 years old (M = 45.95; SD = 9.39). The inclusion criteria were: Having a pure FM diagnosis (not having another rheumatic disease or painful condition) for at least six months. Finally, all the

participants had the response consistency levels (VRIN and TRIN validity scales) within the normal range.

Instruments

We used MMPI-2 (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) in a Portuguese version (Silva, Novo, Prazeres, & Pires, 2006), is a self-administered inventory to assess clinical and personality psychopathology. The results are converted into normalized T-scores, and in general terms, T > 65 are clinically significant. In clinical scales, internal consistency coefficients range between .34 and .87, most of them in .80.

Procedure

Most of the FM patients were recruited through a patient`s association, contacted by telephone and asked about the inclusion criteria and availability to participate in the study. The remaining FM patients were recruited within the scope of a psychological assessment service in a university centre open to the community. Research with MMPI-2 was approved by the ethic commitee of the North Lisbon Hospital Center. The informed consent was obtained and the privacy was observed in accordance with the principles of the Declaration of Helsinki.

Data analysis

We conducted K-means non-hierarchical cluster analysis, based on the five MMPI-2 personality psychopathology scales (PSY-5: *Agressiveness, Psychoticism, Disconstraint, Negative Emotionality/Neuroticism*, and *Introversion/Low Positive Emotionality)* testing a three clusters solution in the first place. As it was not appropriate, we tested a two clusters solution. We used Chi-Square test to identify the differences between the clusters in the sociodemographic nominal and ordinal variables and a one-way analysis of variance (ANOVA) to test the differences in age and

diagnosis duration. We used multivariate analysis of variance (MANOVA) to test the differences between the two clusters in the MMPI-2 clinical scales.

Results

In the K-means two-cluster solution, based on the scores of the PSY-5 MMPI-2 scales, convergence was achieved after three iterations. The distance between final cluster centers was 23.945. The characterization features are presented in Table 1.

The larger cluster (n = 32) has no clinically significant elevation, and the other cluster (n = 24) has clinically significant elevations (T ≥ 65) in two scales: *Negative Emotionality (*M = 65.25, SD = 9.66; t = -3.38; p = .001) and *Introversion* (M = 68.38, SD = 9.90; t= -8.61; p= .000 (Figure 1).

The MANOVA showed significant differences between the clusters in the composite of clinical scales (Wilk's Λ = .415; $F(10,45)$ = 6.344; p = .000; η^2par = .585). Both clusters had clinically significant elevations in *Hypochondriasis*, *Depression*, *Hysteria*, and *Schizophrenia* (Figure 2), and Cluster 2 also had it in *Psychasthenia (*M = *69.63, SD = 8.99;* t = -3.54; p = .001).

Discussion

As hipothesized, we found different clinical levels in the psychopathology and personality dimensions of FM patients, organized in two clusters. One of them (cluster 2) is in line with Type D personality found by Ablin et al. (2016), and it is relevant that this cluster has higher *Introversion* mean levels than the *Neuroticism* ones. As the presence of positive affect protects against the experiencing of negative affect in times of stress and pain (Davis, Zautra, & Smith, 2004), this protective aspect is absent in this cluster. As Vendrig, Derksen, & Mey (2000) found that pretreatment higher scores in Introversion predicted decreased satisfaction with the treatment, decreased self-perceived emotional change, and a probability of investing less energy in the treatment process, this could be a relevant implication to any intervention with these patients.

Cluster 2 has an extremely high mean level of *Depression*, as the most elevated scale of the neurotic triad, a configuration that does not characterize chronic pain patients in general, as *Hypochondriasis* and *Hysteria* are usually the more elevated scales in these patients (Ahles et al., 1984; Claros et al., 2006; Porter-Moffitt et al., 2006; Keller & Butcher, 1991). Cluster 2 has also clinically significant levels of *Psychasthenia*, which corresponds to a diagnosis close to Obsessive-Compulsive Disorder (Graham, 2012).

Apart from heterogeneity, we identified common features of the FM patients. Both clusters have clinically significant levels in the neurotic triad, and in *Schizophrenia*, reflecting a pathological clinical profile, predominantly neurotic but also reflecting social alienation, unusual beliefs, confusion and lack of adequacy, wich differentiates FM from other chronic pain samples, in which the neurotic triad only is expected to be elevated (e.g., Keller & Butcher, 1991).

A group of FM patients have relevant personality, clinical and specific features that undoubtedly may compromise any regular chronic pain treatment. This personality pattern has a double implication, at both emotional and relational level, as high Negative Emotionality hinders relations with others, and high Introversion leads to emotional and social disengagement (Friedman, Lewak, Nichols, & Webb, 2001). Beyond heterogeneity, affective distress is a common aspect to the sample and it should require psychological intervention as part of any medical intervention.

This work has some limitations, mainly the sample dimension, and the absence of a control group. The fact that the sample is composed by women only makes the interpretations appropriate to female fibromyalgia patients only. As strengths of the study, we aimed for a FM community sample, with a homogeneous age range and, to our best knowledge, it is also the first study exploring the heterogeneity in the clinical

and psychopathological symptomatology in FM patients, based exclusively on structural and relatively stable personality characteristics.

In future research it would be important to study the adherence of FM patients to medical and psychological interventions, the treatment results, and relate them to the personality and psychopathology features.

References

Ablin, J. N., Buskila, D., Van Houdenhove, B., Luyten, P., Atzeni, F., & Sarzi-Puttini, P. (2012). Is fibromyalgia a discrete entity? *Autoimmunity Reviews*, *11*, 585–588. doi:10.1016/j.autrev.2011.10.018

Ablin, J. N., Zohar, A. H., Zaraya-Blum, R., & Buskila, D. (2016). Distinctive personality profiles of fibromyalgia and chronic fatigue syndrome patients. *PeerJ*, *4*: e2421; doi:10.7717/peerj.2421

Ahles, T. A., Yunus, M. B., Riley, S. D., Bradley, J. M., & Masi, A. T. (1984). Psychological factors associated with primary fibromyalgia syndrome. *Arthritis & Rheumatism*, *27*, 1101–1106.

Arnold, L. M., Choy, E., Clauw, D. J., Goldenberg, D. L., Harris, R. E, Helfenstein, M. Jr…, Wang, G. (2016). Fibromyalgia and chronic pain syndromes: A white paper detailing current challenges in the field. *Clinical Journal of Pain*, *32*, 737–746. doi:10.1097/AJP.0000000000000354

Arnold L. M., Hudson, J. I., Hess, E. V., Ware, A. E., Fritz, D. A., Auchenbach, M. B., …Keck, P. E. Jr. (2004). Family study of fibromyalgia. *Arthritis & Rheumatism*, *50*, 944–952. doi: 10.1002/art.20042

Bucourt, E., Martaillé, V., Mulleman, D., Goupille, P., Joncker-Vannier, I., Huttenberger, B.,…Courtois, R. (2018). Comparaison des cinq grands traits de

personnalité dans la fibromyalgie et les autres maladies rhumatismales. *Revue du Rheumatisme,* 85, 188–194. doi:10.1016/j.rhum.2017.07.008

Butcher, J. N., Dahlstrom, W. G., Graham, J. R., Tellegen, A, & Kaemmer, B. (1989). *The Minnesota Multiphasic Personality Inventory-2 (MMPI-2): Manual for administration and scoring*. Minneapolis: University of Minnesota Press.

Claros, L., Cano, M., Presa, A., Barceló, J., Satamán, P., Roca, J., …Pàmias, M. (2006). Perfiles clínicos en pacientes con fibromialgia que acuden a un centro de salud mental: Obtención de un índice predictivo de gravedad psicopatológica. *Actas Españolas de Psiquiatria*, *34,* 112–122.

Davis, M. C. Zautra, A. J., & Smith, B. W. (2004). Chronic pain, stress, and the dynamics of affective differentiation. *Journal of Personality, 72,* 1133-1159. doi:10.1111/j.1467-6494.2004.00293.x

Di Tella, M., Tesio, V., Ghiggia, A., Romeo, A., Colonna, F., Fusaro, E.,…& Castelli, L. (2018). Coping strategies and perceived social support in fibromyalgia syndrome: Relationship with alexithymia. *Scandinavian Journal of Psychology*, *59,* 167–176.

Eich, W., Hartmann, M., Muller, A., & Fischer, H. (2000). The role of psychosocial factors in fibromyalgia syndrome. *Scandinavian Journal of Rheumatology*, *29,* 30–31.

Friedman, A. F., Lewak, R., Nichols, D. S., & Webb, J. T. (2001). *Psychological assessment with the MMPI-2*. Mahwah, NJ: Lawrence Erlbaum Associates.

Graham, J. R. (2012). *MMPI-2: Assessing personality and psychopathology* (5th ed.). New York, NY: Oxford University Press.

Keller, L. S., & Butcher, J. N. (1991). *Assessment of chronic pain patient with the MMPI-2*. Minneapolis: University of Minnesota Press.

Malin, K., & Littlejohn, G. O. (2012). Personality and fibromyalgia syndrome. *The Open Rheumatology Journal, 6,* 273–285. doi:10.2174/1874312901206010273

Novo, R., Gonzalez, B., Peres, R., & Aguiar, P. (2017a). A meta-analysis of studies with the Minnesota Multiphasic Personality Inventory in fibromyalgia patients. *Personality and Individual Differences, 116,* 96–108. doi:10.1016/j.paid.2017.04.026

Novo, R., Gonzalez, B., Peres, R., & Aguiar, P. (2017b). Corrigendum to "A meta-analysis of studies with the Minnesota Multiphasic Personality Inventory in fibromyalgia patients". Personality and Individual Differences. doi:10.1016/j.paid.2017.07.022

Porter-Moffitt, S., Gatchel, R. J., Robinson, R. C., Deschner, M., Posamentier, M., Polatin, P., & Lou, L. (2006). Biopsychosocial profiles of different pain diagnostic groups. *The Journal of Pain, 7*, 308–18. doi:10.1016/j.jpain.2005.12.003

Silva, D., Novo, R., Prazeres, N., & Pires, R. (2006). *Inventário Multifásico de Personalidade de Minnesota (Adultos): Versão experimental portuguesa do MMPI-2 [Minnesota Multiphasic Personality Inventory (Adults): Portuguese experimental version of MMPI-2]*. Lisboa: Centro de Investigação em Psicologia e Faculdade de Psicologia da Universidade de Lisboa.

Thiagarajah, A. S., Guymer, E. K., Leech, M., & Littlejohn, G. O. (2014). The relationship between fibromyalgia, stress and depression: Why does stress lead to fibromyalgia in some patients? *International Journal of Clinical Rheumatology*, *9*, 371–384. doi:10.2217/IJR.14.30

Thieme, K., Mathys, M, & Turk, D. C. (2017). Evidenced-Based Guidelines on the Treatment of Fibromyalgia Patients: Are They Consistent and If Not, Why Not? Have Effective Psychological Treatments Been Overlooked? *Journal of Pain*, *18*, 747–756. doi: 10.1016/j.jpain.2016.12.006

Torres, X., Bailles, E., Valdes, M., Gutierrez, F., Peri, J. M., Arias, A.,… Collado, A. (2013). Personality does not distinguish people with fibromyalgia but identifies subgroups of patients. *General Hospital Psychiatry*, *35*, 640–648. doi:10.1016/j.genhosppsych.2013.07.014

Van Houdenhove, B., Luyten, P., & Egle, U. T. (2009). Stress as a key concept in chronic widespread pain and fatigue disorders. *Journal of Musculoskeletal Pain*, *17*, 390–399. doi:10.3109/10582450903284745

Van Middendorp, H., Kool, M. B., van Beugen, S., Denollet, J., Lumley, M. A., & Geenen, R. (2016). Prevalence and relevance of Type D personality in fibromyalgia. *General Hospital Psychiatry*, *39*, 66–72. doi:10.1016/j.genhosppsych.2015.11.006

Vendrig, A., Derksen, J., & Mey, H. (2000). MMPI-2 personality psychopathology five (PSY-5) and prediction of treatment outcome for patients with chronic back pain. *Journal of Personality Assessment*, *74*, 423-438. doi:10.1207/S15327752JPA7403–6